

## REMARKS

Applicants would like to thank the Examiner for taking the time to have a telephone interview with the Applicants' Attorney on November 1, 2005 regarding this application. At the conclusion of the interview, the Examiner indicated that he would provide an interview summary. The content of that telephone interview will be referred to below. If after receiving the Interview Summary, Applicants feel there are any discrepancies that need to be addressed, Applicants will do so at that time.

### **Objection to the Figures:**

Paragraph 2 of the Action objects to Figure 4C because "Vb1-Vb4" should be changed to -Vd1-Vd4--. A replacement sheet has been included with this submission. Applicant respectfully requests withdrawal of this objection.

### **Specification Objection Under 37 CFR 1.75(d)(1)**

Paragraph 3 of the Action objects to the specification as failing to provide proper antecedent basis for the claimed subject matter. The Action states that the applicants "failed to provide adequate written description of how electrons migrate toward and [are] retained in the trapping layer when a positive voltage is applied to the base and a negative voltage is applied to the gate." The Action further states that "[t]he electrons move from negative voltage to positive voltage." The Action seems to imply that the applicant intends electrons to travel from the positive base through first isolating layer 103 into isolating layer 105. Applicants respectfully assert that this is not the path that electrons travel.

Applicant would like to call the examiners attention to figure 7E and paragraph 0049 of the applicant's specification. Figure 7E and paragraph 0049 discuss gate injection. During gate injection, electrons are injected from the gate into the trapping layer. In order to achieve such injection, a positive voltage is applied to the base and a negative voltage is applied to the gate electrons move from conductive gate 102 through the second isolating layer 105 and into trapping layer 104. (Figure 7E and paragraph 0049).

Accordingly, Applicants believe that the description provides sufficient antecedent basis for the injection process and Applicants respectfully request withdrawal of the objection.

**Claim Rejections Under §103:**

Paragraph 5 of the Action rejects claims 1-12 under 35 U.S.C. §103(a) as being unpatentable over Sato (U.S. Patent 5,576,995) in view of Wang (U.S. Patent 6,331,953). Applicants respectfully traverse the rejection because Sato and Wang, alone or in combination, fail to make out a *prima facie* case of obviousness.

In rejecting claims 1-12, the Action primarily relies on Sato. The Action admits, however, that Sato fails to teach all of the elements of claims 1-12. Accordingly, Sato cannot render claims 1-12 unpatentable, because as the Action admits, Sato fails to teach, suggest, or disclose each and every element of claims 1-12. The Action must, therefore, rely on Wang to make up for the deficiencies of Sato, which it does not.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to

combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).” (See MPEP §706.02(j)).

First, with respect claim 1, the Action does not provide the substantial evidence based on the references themselves, necessary to support a *prima facie* case of obviousness. As noted above, “[t]he teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).” See MPEP §706.02(j). Further, each finding of fact upon which a conclusion of obviousness is based must be supported by substantial evidence and, in particular the conclusion that the prior art suggests or motivates the modification of a prior art reference must be based on findings supported by substantial evidence. *In re Kotzab*, 217 F. 3d 1365, 1370-71 (Fed. Cir. 2000). Hence, a *prima facie* case of obviousness cannot be made out by merely asserting that modifications to the prior art are “well within the ordinary skill of the art.” *Ex Parte Leavengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993).

During the telephone interview, the Examiner stated that the memory of the Sato and Wang patents were the same. Applicants respectfully disagree. While at a high level both patents are directed to memory devices, the claims of the present application are not directed to such a high level. The method of Sato applies to a memory cell with a conducting floating gate, whereas the method of Wang does not have a conducting floating gate. Further, as stated in Wang the memory device presented in Wang “is a huge advantage...over the prior art memory

cells *especially floating gate cells* where over-erase can cause failure of the memory array.” (Wang, col. 15, lines 9-13, emphasis added). Additionally Wang states that “[i]n memory cells constructed using conductive floating gate, the charge that gets injected into the gate is distributed equally across the entire gate.” While in low conductivity or nonconductive floating gates charge is not distributed equally across the entire gate, but “only in the localized trapping region.” (Wang, col. 3, line 66- col. 4 line 10).

In other words, Wang goes to great length to distinguish the memory structure taught in Wang from floating gate structures such as that taught in Sato. Thus, far from providing the requisite substantial evidence in support of a motive to combine the teaching of Wang with Sato, Wang actually teaches away from the teachings of Sato. Accordingly, Applicant asserts that the Action fails to make out a *prima facie* case of obviousness, because it fails to provide the substantial evidence in support of the conclusion that *the cited references* teach a motivation to modify the teachings of Sato with the teachings of Wang. Stated another way, the statement “a person of ordinary skill in the art would have been motivated to use the verify operation of Wang to check whether the memory has been erased completely” is not based on the references being cited and appears at best to be based on hindsight gleaned from the teachings of the present application.

Second, the Action makes no attempt to provide a likelihood of success and, therefore, combining the two references was improper on that basis alone. Applicant therefore respectfully requests that the rejection as to claim 1 be withdrawn. Claims 2-12, ultimately depend from claim 1 and are allowable for at least the reasons discussed above with respect to claim 1.

Finally, even if the two references were to be combined, they would at best suggest removing electrons from the charge trapping layer, since the only teaching common to the two references is common teaching of applying erase voltages to remove electrons from a charge trapping layer. This differs from the claimed invention in which electrons are injected in the charge trapping layer to erase the memory cell. Accordingly, even when combined the two references do not teach each and every element of the invention claimed in claim 1. In short, Sato and Wang, alone or in combination fail to meet even one requirement for a *prima facie* case of obviousness with respect to claim 1, much less all three.

Accordingly, Applicant respectfully requests withdrawal of the rejection as to claim 1. Applicant, also respectfully request withdrawal of the rejection as to claims 2-13 because they depend from claim 1, which is itself allowable over the art of record.

Additionally, with respect to claim 2, as stated above, a *prima facie* case of obviousness cannot be made out by merely asserting that modifications to the prior art are “well within the ordinary skill of the art.” *Ex Parte Leavengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). The Action states that “it would have been obvious to apply a negative voltage to the substrate in the erase procedure.” Merely asserting that “it would have been obvious” is not enough. Applicant does not argue that applying a negative voltage to a substrate is unknown. The Applicant argues that the combination, as claimed in the present application is not known. As the Action admits on page 4 nothing in Sato or Wang teaches applying a negative voltage to the substrate in the erase procedure. In the art cited there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify or combine the specific reference cited to achieve the inventions claimed in claim 2.

While the Action attempts to provide a rational for why it would be obvious to use a negative voltage, the Action fails to address the fact that neither reference applies the negative voltage. Thus, the rational provided is not cleaned form the references themselves. Again, Applicants do not claim that it is unknown to use a negative voltage on the substrate. Rather, Applicants have assert that the combination claimed in claim 2 was unknown in the prior art. The Action does nothing to counter this assertion.

Further, in all five examples and for each of the writing, erasing, and reading operations of Sato the substrate is held at 0 volts, therefore, Sato teaches away from applying a negative voltage to the substrate. Finally, the Action makes no attempt to provide a likelihood of success and, therefore, combining the two references was improper on that basis alone. Accordingly, Applicants respectfully request withdrawal of the rejection as to claim 2 ,because the Action fails to make out a *prima facie* case of obviousness for the reasons stated above.

With respect to claims 4, 6, 8, and 10, The Action admits that Sato fails to teach, suggest or disclose varying the gate and base. In order to make up for this deficiency, the Action states that Wang discloses techniques in which the voltage on the drain is held constant, while the voltage on the gate is varied. Thus, the action states that Wang discloses varying the voltage between the gate and drain; however, for the invention as claimed in claims 4-11, “pulses of unequal magnitude” are applied between the base and the gate. Thus, the invention as claimed in claims 4-11 is directed to varying the voltage between the gate and base.

Accordingly, neither Sato nor Wang, alone or in combination, teach, suggest, or disclose each and every element of claims 4-11. Applicants therefore assert that claims 4-11 are allowable over the art of record for these additional reasons.

Paragraph 6 of the Action rejects claims 13-22 under 35 U.S.C. §103(a) as being unpatentable over Sato and Wang in further view of Yiu (U.S. Patent 5,526,307). Applicants respectfully traverse the rejection because Sato, Wang, and Yiu alone or in combination, fail to teach, suggest, or disclose all elements of the claims for at least the reasons described below. In particular, there is no suggestion or motivation to combine. Accordingly, the Action fails to make out a *prima facie* case of obviousness.

In rejecting claim 13, the Action primarily relies on Sato. The Action admits, however, that Sato fails to teach all of the elements of claim 13. Accordingly, Sato cannot render claim 13 unpatentable, because as the Action admits, Sato fails to teach, suggest, or disclose each and every element of claim 13. The Action must rely on the other two cited references to make up for the deficiencies of Sato. The references do not, however, support a *prima facie* case of obviousness because *inter alia*, there is no suggestion or motivation to combine any one reference with any other, much less a motivation to combine the teachings of all three references to achieve the very specific combinations of claims 13-22. Similarly, none of the reference includes any indication that one would be successful in achieving the very specific invention as claimed in claims 13-22 by combining these four different references.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable

expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).” (See MPEP §706.02(j)).

First, the Action does not provide the substantial evidence based on the references themselves, necessary to support a *prima facie* case of obviousness. As noted above, “[t]he teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).” See MPEP §706.02(j). Further, each finding of fact upon which a conclusion of obviousness is based must be supported by substantial evidence and, in particular the conclusion that the prior art suggests or motivates the modification of a prior art reference must be based on findings supported by substantial evidence. *In re Kotzab*, 217 F. 3d 1365, 1370-71 (Fed. Cir. 2000). Hence, a *prima facie* case of obviousness cannot be made out by merely asserting that modifications to the prior art are “well within the ordinary skill of the art.” *Ex Parte Leavengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993).

As discussed above with respect to claim 1, while at a high level both patents are directed to flash memory, the claims of the present application are not directed to such a high level, therefore, for the same reasons discussed above; it would not be obvious to combine Sato and Wang as suggested in the Action. Further, nothing in Yiu teaches a motivation to modify the teachings of Sato with the teachings of Wang and Yiu.

Accordingly, Applicant asserts that the Action fails to make out a *prima facie* case of obviousness, because it fails to provide the substantial evidence in support of the conclusion that *the cited references* teach a motivation to modify the teachings of Sato with the teachings of



Wang and Yiu. The rejection is not based on the references being cited and appears at best to be based on hindsight gleaned from the teachings of the present application. Second, the Action makes no attempt to provide a likelihood of success and, therefore, combining the two references was improper on that basis alone.

Claims 14-22 ultimately depend from claim 13 and are allowable for at least the reasons discussed above with respect to claim 13. Additionally, with respect to claims 15-22 the Action states that “Wang discloses different erase techniques in which either the drain voltage remains constant and the gate voltage is ramped...or the gate voltage remains constant while the drain voltage is ramped.” The Action states that “[i]t would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the erase operation of Sato by varying the voltages applied to the control gate, the drain of the cell as Wang disclosed.” But as with claims 4-11, the invention of claims 15-22 is directed to embodiments in which the voltage between the gate and base is varied, not the voltage between the gate and drain.

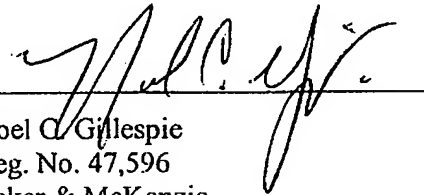
For the reasons discussed above, Applicants respectfully requests that the rejection as to claims 13-22 be withdrawn.

**CONCLUSION**

Applicant believes that given the above amendments and remarks, the claims are now in condition for allowance and such is respectfully requested. No new claim fees are believed to be necessitated by this response. The Examiner is requested to charge any additional fees that may due with this response to deposit account 13-0480.

Respectfully submitted,

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